WHAT IS CLAIMED IS:

1. 1. A method for dynamically allocating directory memory in a node of a computer
2. system, the directory memory comprising a snoop directory portion and a remote
3. memory directory portion, the method comprising the steps of:
4. counting a number of snoop directory entry refills during a first time interval;
5. counting a number of remote memory directory entry refills during the first time
6. interval;
7. determining a first ratio of the number of snoop directory entry refills during the
8. first time interval to the number of remote memory directory entry refills during
9. the first time interval; and
10. allocating a first portion of a directory memory in the node to the snoop directory
11. portion, and a second portion of the directory memory in the node to the remote
12. memory directory portion,
13. wherein the first ratio is a determinant of the sizes of the first portion and the
14. second portion.

1. 2. The method of claim 1, further comprising comprising the steps of:
2. comparing the first ratio to a desired ratio;
3. increasing the first portion of the directory memory allocated to the snoop
4. directory portion if the difference between the first ratio and the desired ratio
5. exceeds a first predetermined value; and
6. increasing the second portion of the directory memory allocated to the remote
7. memory directory portion if the difference between the desired ratio and the first
8. ratio exceeds a second predetermined value.

1. 3. The method of claim 2, wherein the steps of increasing the first portion and the
2. second portion of the memory directory changes the first portion and the second
3. portion by not more than a predetermined fraction of the directory memory.

1. 4. The method of claim 3, wherein the predetermined fraction of the directory
2. memory is 10% or less of the directory memory.

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1 5. The method of claim 1, the step of allocating the first portion of the directory
2   memory in the node to the snoop directory portion, and the second portion of the
3   directory memory in the node to the remote memory directory portion further
4   comprises the steps of:
5   removing an address range from the first portion of the directory memory; and
6   casting out a snoop directory entry from the address range removed.

1 6. The method of claim 1, the step of allocating the first portion of the directory
2   memory in the node to the snoop directory portion, and the second portion of the
3   directory memory in the node to the remote memory directory portion further
4   comprising the steps of:
5   removing a segment of a current address range of the first portion of the
6   directory memory at the end of the first time interval;
7   adding only remote memory entry refills into the segment during a subsequent
8   time interval;
9   writing information into each snoop directory entry instance identifying the snoop
10   directory entry instance as a snoop directory entry; and
11   writing information into each remote memory directory entry instance identifying
12   the remote memory directory entry instance as a remote memory directory entry.

1 7. The method of claim 1, the step of allocating the first portion of the directory
2   memory in the node to the snoop directory portion, and the second portion of the
3   directory memory in the node to the remote memory directory portion further
4   comprising the steps of:
5   allocating a first portion of a congruence class in the directory memory to snoop
6   directory entries; and
7   allocating a second portion of the congruence class in the directory memory to
8   remote memory directory entries.

1 8. The method of claim 1, wherein the step of determining the ratio of the number
2   of snoop directory entry refills to the number of remote memory directory entry
3   refills during the time interval is performed by a computer program.

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1   9.   The method of claim 8, wherein the step of allocating a first portion of a directory

2   memory in a node to a snoop directory portion, and a second portion of the

3   directory memory in the node to a remote memory directory portion is performed

4   by the computer program.

1   10.   A computer system comprising:

2   one or more nodes, each node comprising more than one processor;

3   a directory memory in a particular node that is partitioned into a snoop directory

4   portion and a remote memory directory portion;

5   a memory controller in the particular node capable of determining a number of

6   snoop directory refills over a first time interval and determining a number of

7   remote memory directory refills over the first time interval; and

8   an allocation control capable making a change in a size of the snoop directory

9   portion and a size of the remote memory directory portion respondent to the

10   number of snoop directory refills and the number of remote memory directory

11   refills at the end of the first time interval.

1   11.   The computer system of claim 10, further comprising a desired ratio for refills;

2   wherein the desired ratio for refills is a predetermined target for a first ratio of the

3   snoop directory refills over the predetermined time interval to the number of

4   remote memory directory refills over the predetermined time interval.

1   12.   The computer system of claim 11, wherein the allocation control computes the

2   first ratio and, if a ratio difference between the first ratio and the desired ratio

3   exceeds a predetermined value, makes the change in the size of the snoop

4   directory portion and the size of the remote memory directory portion;

5   wherein the change in the size of the snoop directory portion and the remote

6   memory directory portion is designed to reduce the ratio difference for a

7   subsequent time interval.

1   13.   The computer system of claim 12, further comprising:

2   a resettable timer counter, suitable for determining elapsed time;

3   a timer compare value that is preset to the predetermined time interval;

4   a first refill counter that is incremented each time a snoop directory refill occurs;

5   a second refill counter that is incremented each time a remote memory directory

6   refill occurs;

7   a compare that is coupled to the resettable timer counter and the timer compare

8   value and, respondent to an equal compare of a content of the resettable timer

9   counter and the timer compare value, asserts a compare signal that is coupled to

10   the allocation control, the timer counter, the first refill counter, and the second

11   refill counter; the compare signal locking the timer counter, the first refill counter

12   and the second refill counter;

13   wherein the allocation control, respondent to the compare signal being asserted,

14   computes the first ratio, compares the first ratio to the desired ratio for refills to

15   obtain the ratio difference, and, respondent to the ratio difference, makes the

16   change in the size of the snoop directory portion and the remote memory

17   directory portion; subsequent to making the change in the size of the snoop

18   directory portion and the remote memory directory portion, the allocation control

19   unlocks the timer counter, the first refill counter, and the second refill counter.

1   14.   The computer system of claim 10 wherein the change in size of the snoop

2   directory at the end of the time period is less than a predetermined fraction of the

3   directory memory.

1   15.   The computer system of claim 10, wherein the snoop directory portion is defined

2   by a snoop directory portion address range, and the remote memory directory

3   portion is defined by a remote memory directory address range; the allocation

4   control capable making a change in a size of the snoop directory portion and a

5   size of the remote memory directory portion by redefining the snoop directory

6   portion address range and the remote memory directory portion address range.

1   16.   The computer system of claim 10, wherein the snoop directory portion and the

2   remote memory directory portion are defined as portions of congruence classes

3   in a set-associative directory memory.

1   17.   A computer program product that, when executed by a suitable computer having

2   a node with a directory memory partitioned into a snoop directory portion and a

3   remote memory directory portion, performs the steps of:

4		receiving information about the number of snoop directory entry refills in a node
5		in a computer system over a predetermined time interval;
6		receiving information about the number of remote memory directory entry refills
7		in a node in the computer system over the predetermined time interval;
8		computing an allocation of a directory memory in the node into the snoop
9		directory portion and the remote memory directory portion, the allocation
10		designed to cause a first ratio of the number of snoop directory entry refills to the
11		number of remote memory entry refills toward a desired ratio for refills during a
12		subsequent time interval; and
13		transmitting the allocation to the node.
1	18.	A computer-readable media containing a computer program product that, when
2		executed by a suitable computer having a node with a directory memory
3		partitioned into a snoop directory portion and a remote memory directory portion,
4		performs the steps of:
5		receiving information about the number of snoop directory entry refills in a node
6		in a computer system over a first time interval;
7		receiving information about the number of remote memory directory entry refills
8		in a node in the computer system over the first time interval;
9		computing an allocation of a directory memory in the node into the snoop
10		directory portion and the remote memory directory portion, the allocation
11		designed to cause a first ratio of the number of snoop directory entry refills to the
12		number of remote memory entry refills toward a desired ratio for refills during a
13		subsequent time interval; and
14		transmitting the allocation to the node.